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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/814,302	SILVERSTEIN ET AL.	
	Examiner	Art Unit	
	Mia M. Thomas	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 June 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,5-7,9-12,14-18,21-29,31,33 and 35-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5-7,9-12,14-18,21-29,31,33 and 35-49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 June 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is responsive to applicant's remarks received on 18 June 2009. Claims 3, 4, 8, 13, 19, 20, 30, 32 and 34 have been canceled. Applicant hereby adds new claims 44-49 which are supported at least by the teachings of Figure 1 and the associated specification. A complete response to applicant's remarks follows here below.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1, 9-12,23-25,29,36, 16, 21, 26, 27, 33, 39, 40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding the term "differences" the Examiner is unclear what exactly the applicant is referring to. The term "differences" is considered vague and indefinite since the applicant has not defined how to determine that a "difference" exists between "two overlapping strips". For clarity, the Examiner is stating that "the differences" as recited at each of the aforementioned claims is unclear to the Examiner because, the Examiner is unable to determine if the differences are according to a particular measure of the overlapping strips or if the differences are according to the content of the actual strips. The applicant has not specified what the difference in the overlapping strip is pertaining to since the term "differences" is vague and indefinite, the Examiner is unable to properly define how to determine said "differences". The response to the rejections in applicant's remarks does not clarity the original rejection regarding the term "differences". Appropriate clarification and correction is required for proper claim analysis.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 2,5,6,33,38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mai et al. (US 20040057633 A1) in combination with Kang et al (US 20030235344 A1).

Note: The Examiner is reading "composite image" as an image that is created by a combination of multiple images that are merged into one single image.

Regarding Claim 1:(Currently Amended-As best understood by the Examiner) Mai teaches a method for blending images into a composite image (Refer to abstract; "The present invention provides a system for mosaicing multiple input images, captured by one or more remote sensors, into a seamless mosaic of an area of interest." at abstract); comprising:

selecting two images having overlapping content ("More specifically, the present invention provides a system for mosaicing two overlapping digital input images together. One input image, comprising a number of pixels having certain intensity, is identified as the reference image. A second input image, also comprising a number of pixels having certain intensity, overlaps the reference image in an overlap area." at paragraph [0008]);

determining differences between the overlapping two strips ("The present invention also provides a method for rendering multiple, partially-overlapping input image strips of a target

terrain into a seamless image mosaic of the target terrain that includes normalizing the intensity of each input image to a desired mean and standard deviation. A reference image and a secondary image, having a partially overlapping area and a common boundary area are provided. A segmented seam line between the reference and secondary image strips, that minimizes perspective imaging effects of elevated features in those images, is established. The boundary area is divided into segments corresponding to the segments of the seam line. A balancing correlation matrix is computed for each such segment." at paragraph [0013, 0060-0068]);

determining a minimized line through the overlapping strips where the differences between the overlapping strips are minimized (Refer to paragraph [0012]; specifically, "In addition, the present invention also provides a method of establishing a seam line between adjacent image strips that minimizes perspective imaging effects of elevated features in the image strips. An initial seam line between the image strips is selected.");

and blending the two images together along the minimized line to create a composite image ("The present invention provides a versatile system for efficiently and reliably stitching together images, collected from high-resolution digital imaging sensors, into a seamless, high quality, wide FOV mosaic image." at paragraph [0007]; also at paragraph [0012]; [0029])

Kang teaches dividing the two images into strips ("This multiperspective plane sweep approach uses virtual camera positions to compute depth maps for strips of overlapping pixels in adjacent images. These strips, which are at least one pixel in width, are perpendicular to camera motion." at paragraph [0011] also at paragraph [0013])

selecting a strip in each of the two images where the two images overlap each other (Refer to Figure 3b and 4b; "[0030] FIG. 5 is a schematic diagram that illustrates the use of depth maps and virtual camera positions for selecting pixels for blending.");

Mai and Kang are combinable because they are in the same field of image transformations and blending or combining images portions.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai and Kang.

All of the claimed elements were known in the prior art and one skilled in the art could have combined the teachings as claimed, by known methods with no change in their respective functions, and the combination of Mai and Kang would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

The suggestion/motivation for combining the teachings of Mai and Kang would have been "...because the multiperspective plane sweep approach described herein is both computationally efficient, and applicable to both the case of limited overlap between the images used for creating the image mosaics, and to the case of extensive or increased image overlap." at paragraph [0051], Kang.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai and Kang to obtain the specified claimed elements of Claim 1.

Regarding Claim 33 (Currently Amended): Claim 33 recites claimed subject matter that equally resembles the claimed method of Claim 1. Claim 33 is rejected for the same reasons, motivation and rationale as rejected above at Claim 1. Claim 33 is the computer readable medium encoded with software that resembles the claimed method of Claim 1. Mai teaches ("The modules, algorithms and processes described above can be implemented in a number technologies and configurations. Embodiments of the present invention may comprise functional instances of software or hardware, or combinations thereof. Furthermore, the modules and processes of the present invention may be combined together in a single functional instance (e.g., one software program), or may comprise operatively associated separate functional devices (e.g., multiple networked processor/memory blocks). All such implementations are comprehended by the present invention." at paragraph [0099]).

Regarding Claim 2(Currently Amended): Kang teaches the selected images belong to a set of images comprising a scene. ("In general, image mosaics are a combination of two or more overlapping images that serve to present an overall view of a scene from perspectives other than those of the individual images used to generate the mosaic." at paragraph [0004]).

Regarding Claim 5 (Original) Kang teaches the selected images are divided along a common plane. the selected images are divided along a common plane ("This multiperspective plane sweep approach uses virtual camera positions to compute depth maps for strips of overlapping pixels in adjacent images. These strips, which are at least one pixel in width, are perpendicular to camera motion." at paragraph [0011]);

Regarding Claim 6: (Original) Kang teaches the selected images are divided into strips along one of a vertical plane or a horizontal plane ("This multiperspective plane sweep approach uses virtual camera positions to compute depth maps for strips of overlapping pixels in adjacent images. These strips, which are at least one pixel in width, are perpendicular to camera motion. For horizontal camera motion, these strips correspond to pixel columns." at paragraph [0011]).

Regarding Claim 38:(Currently Amended) Kang teaches the determining differences comprises determining differences between image data content of the overlapping strips (Refer to paragraph [0057]).

6. Claims 21 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mai et al. (US 20040057633 A1) in combination with Kang et al (US 20030235344 A1) and further in view of Uyttendaele et al. (US 6813391 B1).

Regarding Claim 21: (Currently Amended) Mai teaches a computer based system for blending images into a composite image (Refer to abstract; "The present invention provides a system for mosaicing multiple input images, captured by one or more remote sensors, into a seamless mosaic of an area of interest." at abstract);

determine a minimized line through the overlapping strips where a sum of the pixel difference values between the overlapping strips is minimized; (Refer to paragraph [0012]; specifically, "In addition, the present invention also provides a method of establishing a seam line between adjacent image strips that minimizes perspective imaging effects of elevated features in the image strips. An initial seam line between the image strips is selected.");

and blend the two images together along the minimized line to create a composite image ("The present invention provides a versatile system for efficiently and reliably stitching together images, collected from high-resolution digital imaging sensors, into a seamless, high quality, wide FOV mosaic image." at paragraph [0007]; also at paragraph [0012]; [0029])

Kang teaches a computer ("The invention is operational with numerous other general purpose or special purpose computing system environments or configurations. Examples of well known computing systems, environments, and/or configurations that may be suitable for use with the invention include, but are not limited to, personal computers..." at paragraph [0035]);

Kang teaches divide two images (Refer to paragraph [0011] also at paragraph [0013] and Figures 3a and 3b) having overlapping content into strips along a common plane (Refer to Figure 3b and 4b; "[0030] FIG. 5 is a schematic diagram that illustrates the use of depth maps and virtual camera positions for selecting pixels for blending."; "...a perspective warping is first applied to the

images to put them into a common plane." at paragraph [0013]); wherein each strip is a long and narrow piece of the image having one dimension which is greater than another dimension of the respective strip (At paragraph [0026]; Kang describes that each piece of the image was captures at different origins and disposed at a large angle relative to each other wherein this suggests that one strip would have one dimension which is greater than the other, based on this description)

select a strip of uniform width in each of the two images where the two images overlap each other (Refer to Figures 3a, 3b,4a and 4b)

Uyttendaele teaches determine pixel difference values between the overlapping strips (Refer to Figures 2 and 3, also at column 7, lines 15-60)

Mai, Kang and Uyttendaele are combinable because they are in the same field of merging images into panoramic images.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to determine pixel difference values between the overlapping two strips.

The suggestion/motivation for doing so would have been "This allows the corresponding pixel locations in the first and center images, and the corresponding pixel location in the third and center images to be determined for the overlapping areas. Additionally, the luminance of each pixel in these areas is identified. The exposure correction factors for each overlapping area are then calculated." at abstract, Uyttendaele.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai, Kang and Uyttendaele to obtain the specified claimed elements of Claim 21.

Regarding Claim 43: (Previously Presented) Mai and Kang in combination teach all the claimed elements as rejected above. Mai in combination with Kang does not specifically teach selecting the strips in the two images which comprise the same content of a scene present in the two images.

Uyttendaele teaches selecting the strips in the two images which comprise the same content of a scene present in the two images ("Determining these regions of overlap normally poses no problem since the coordinates of all pixels in each input image are known relative to the same coordinate system as a result of the mosaicing process." at column 2, line 2).

Mai, Kang and Uyttendaele are combinable because they are in the same field of merging images into panoramic images.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to select the strips in the two images which comprise the same content of a scene present in the two images

The suggestion/motivation for doing so would have been "This allows the corresponding pixel locations in the first and center images, and the corresponding pixel location in the third and center images to be determined for the overlapping areas. Additionally, the luminance of each pixel in these areas is identified. The exposure correction factors for each overlapping area are then calculated." at abstract, Uyttendaele.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai, Kang and Uyttendaele to obtain the specified claimed elements of Claim 43.

7. Claims 22,26,27,28,31,41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mai et al. (US 20040057633 A1) in combination with Kang et al (US 20030235344 A1) and further in view of Uyttendaele et al. (US 6813391 B1) and Peterson US (6,411,742 B1).

Regarding Claim 22: (Currently Amended) Mai, Kang and Uyttendaele in combination teach all the claimed elements as rejected above. Mai, Kang and Uyttendaele in combination does not specifically teach a mean squared difference algorithm.

Peterson teaches the two overlapping strips are selected according to a mean squared difference algorithm such that the sum of the mean squared difference values between the overlapping strips is minimized. ("For example, the top left corner of the doorway is horizontally displaced from the bottom left corner of the image by a distance x0 in the first images 18a, while it is displaced by a distance x1 in the second image 18a. Consequently the second image is displaced to the left of the first image by a distance (d-left) given by the mathematical equation: d-left = x0-x1." at column 4, line 12).

Mai, Kang, Uyttendaele and Peterson are combinable because they are in the same field of image transformations, specifically, combining image portions.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to utilize a mean squared difference algorithm for user manipulation such that the sum of the mean squared difference values between two strips is minimized.

The motivation/suggestion for doing so would have been "to save processing time without altering the images and masking out portions of an image." at column 1, line 50+, Peterson.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings

of Mai in combination with Kang and Peterson to obtain the specified claimed elements of Claim 22.

Regarding Claim 26: (Currently Amended-As best understood by the Examiner) Mai teaches a system for blending images into a composite image, comprising: (Refer to abstract; "The present invention provides a system for mosaicing multiple input images, captured by one or more remote sensors, into a seamless mosaic of an area of interest." at abstract); comprising:

Mai also teaches and means for blending the two images along the cut line to create a composite image ("The present invention provides a versatile system for efficiently and reliably stitching together images, collected from high-resolution digital imaging sensors, into a seamless, high quality, wide FOV mosaic image." at paragraph [0007]; also at paragraph [0012]; [0029])

Kang teaches means for dividing two images having overlapping content into strips along a common plane in at least one region of overlap ("This multiperspective plane sweep approach uses virtual camera positions to compute depth maps for strips of overlapping pixels in adjacent images. These strips, which are at least one pixel in width, are perpendicular to camera motion." at paragraph [0011] wherein each strip is a long and narrow piece of the image having one dimension which is greater than another dimension of the respective strip; (Further at paragraph [0013] and Figures 3a and 3b, 4a and 4b)

Uyttendaele teaches means for calculating difference values between image data content of respective pixels of the two images in corresponding strips of uniform length in the at least one region of overlap (Refer to Figures 2 and 3, also at column 7, lines 15-60)

Peterson teaches means for determining a cut line through the two images where the difference values are minimized; (Refer to numeral 10-Computing System; Figure 3c; "The dividing line determiner 54 determines an outline 74 (Fig. 3c)...formed by aligning the current image 18b' and the reference image 18a..." at column 5, line 25 (e.g. Figure 3a, numeral 214 and 216))

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai, Kang, Uyttendaele and Peterson. Mai, Kang, Uyttendaele and Peterson are combinable because they are in the same field of merging images into panoramic images.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai, Kang and Peterson since all the claimed elements were known in the prior art at the time of the invention. The combination of the claimed elements would have yielded predictable results to the skilled artisan. Each of the prior art references teaches a system that computes various processes within that system to blend images into composite images.

The suggestion/motivation for combining the teachings of Mai, Kang, Uyttendaele and Peterson would be that "...because the multiperspective plane sweep approach described herein is both computationally efficient, and applicable to both the case of limited overlap between the images

used for creating the image mosaics, and to the case of extensive or increased image overlap." at paragraph [0051], Kang. Additionally, another suggestion/motivation to combine the teachings of Mai, Kang, Uyttendaele and Peterson would have been "mosaicing multiple input images,

for rendering high-resolution digital images over very large fields of view." at abstract, Mai.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai, Kang, Uyttendaele and Peterson to obtain the specified claimed elements of Claim 26.

Regarding Claim 27: (Currently Amended) Claim 27 equally resembles the claimed subject matter and claimed limitations of Claim 26. The system of independent claim 26 teaches a computing system and implicitly the computing modules as recited in claim 27 would operate in the said computing system of Claim 26. Therefore, claim 27 is rejected for the same reason, rationale and motivation as stated above at claim 26. A system for blending images into a composite image, comprising:

Regarding Claim 28: (Currently Amended) Peterson teaches selecting two overlapping strips according to a mean squared difference algorithm ("For example, the top left corner of the doorway is horizontally displaced from the bottom left corner of the image by a distance x0 in the first images 18a, while it is displaced by a distance x1 in the second image 18a. Consequently the second image is displaced to the left of the first image by a distance (d-left) given by the mathematical equation: d-left = x0-x1." at column 4, line 12).

Regarding Claim 31: (Currently Amended) Peterson teaches the blending of images is performed iteratively (Figure 2B describes the method of blending images iteratively by blending any of images 18a-18d; "...image stitching software 14, blends the images 18a-18d so to generate a single panoramic image 26..." at column 3, line 52) with the composite image being utilized as one of the two images to be blended ("Consequently, additional processing is required to blend the images into each other and create the near seamless panoramic image 26 (Figure 2B)." at column 4, line 45).

Regarding Claim 41: (Previously Presented) Uyttendaele teaches the pairs of the pixels individually correspond to the same subject present in the two images ("Determining these regions of overlap normally poses no problem since the coordinates of all pixels in each input image are known relative to the same coordinate system as a result of the mosaicing process." at column 2, line 2).

8. Claims 7,16,17,35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mai et al. (US 20040057633 A1) in combination with Kang et al (US 20030235344 A1) and further in view of Peterson US (6,411,742 B1).

Regarding Claim 7: (Original) Mai in combination with Kang teach all the claimed elements as rejected above. Mai in combination with Kang does not specifically teach the two overlapping strips are selected according to a mean squared difference algorithm.

Peterson teaches the two overlapping strips are selected according to a mean squared difference algorithm such that the sum of the mean squared difference values between the two selected strips is minimized. ("For example, the top left corner of the doorway is horizontally

displaced from the bottom left corner of the image by a distance x0 in the first images 18a, while it is displaced by a distance x1 in the second image 18a. Consequently the second image is displaced to the left of the first image by a distance (d-left) given by the mathematical equation: d-left = x0-x1." at column 4, line 12).

Mai, Kang and Peterson are combinable because they are in the same field of image transformations, specifically, combining image portions.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to utilize a mean squared difference algorithm for user manipulation such that the sum of the mean squared difference values between two strips is minimized.

The motivation/suggestion for doing so would have been "to save processing time without altering the images and masking out portions of an image." at column 1, line 50+, Peterson.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai in combination with Kang and Peterson to obtain the specified claimed elements of Claim 7.

Regarding Claim 16: (Currently Amended) Mai teaches a method for blending two images into a composite image (Refer to abstract; "The present invention provides a system for mosaicing multiple input images, captured by one or more remote sensors, into a seamless mosaic of an area of interest." at abstract); comprising:

blending the two images along the minimized line to create a composite image ("The present invention provides a versatile system for efficiently and reliably stitching together images,

collected from high-resolution digital imaging sensors, into a seamless, high quality, wide FOV mosaic image." at paragraph [0007]; also at paragraph [0012]; [0029])

Kang teaches dividing two images into strips along a common plane ("This multiperspective plane sweep approach uses virtual camera positions to compute depth maps for strips of overlapping pixels in adjacent images. These strips, which are at least one pixel in width, are perpendicular to camera motion." at paragraph [0011] also at paragraph [0013] and Figures 3a and 3b)

selecting a strip in each image where the two images overlap, wherein the selecting comprises selecting the overlapping strips which have reduced error between the overlapping strips compared with non-selected overlapping strips of the two images (Refer to Figure 3b and 4b; "[0030] FIG. 5 is a schematic diagram that illustrates the use of depth maps and virtual camera positions for selecting pixels for blending." also refer to paragraph [0075]; "The plane or depth resulting in the lowest overall error is chosen as the correct depth.")

and warping the composite image to minimize blurring along the minimized line ("Even if the camera motion is not horizontal, the images are warped or "rectified" to produce an effective horizontal camera motion." at paragraph [0011]).

Peterson teaches determining a minimized line through the selected overlapping strips where differences between the selected overlapping strips are minimized (Figure 3c; "The dividing line determiner 54 determines an outline 74 (Fig. 3c)...formed by aligning the current image 18b' and the reference image 18a..." at column 5, line 25 (e.g. Figure 3a, numeral 214 and 216))

Mai, Kang and Peterson are combinable because they are in the same field of merging images into panoramic images. At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai, Kang and Peterson.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai, Kang and Peterson since all the claimed elements were known in the prior art at the time of the invention. The combination of the claimed elements would have yielded predictable results to the skilled artisan.

The suggestion/motivation for combining the teachings of Mai, Kang and Peterson would be that "...because the multiperspective plane sweep approach described herein is both computationally efficient, and applicable to both the case of limited overlap between the images used for creating the image mosaics, and to the case of extensive or increased image overlap." at paragraph [0051], Kang.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai, Kang and Peterson to obtain the specified claimed elements of Claim 16.

Regarding Claim 17: (Previously Presented) Mai in combination with Kang and Peterson teach all the claimed elements as rejected above. Mai in combination with Kang and Peterson does not specifically teach how the minimized line is determined by calculating mean squared difference values.

Peterson teaches the minimized line is determined by calculating mean squared difference values for pairs of pixels ("For example, the top left corner of the doorway is horizontally displaced from the bottom left corner of the image by a distance x0 in the first images 18a, while it is displaced by a distance x1 in the second image 18a. Consequently the second image is displaced to the left of the first image by a distance (d-left) given by the mathematical equation: d-left = x0-x1." at column 4, line 12).

Mai, Kang and Peterson are combinable because they are in the same field of image transformations, specifically, combining image portions.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to utilize a method of calculating a mean squared difference value for pairs of pixels between the two selected overlapping strips.

The motivation/suggestion for doing so would have been "to save processing time without altering the images and masking out portions of an image." at column 1, line 50+, Peterson.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai in combination with Kang and Peterson to obtain the specified claimed elements of Claim 17.

Regarding Claim 35: (Currently Amended) Mai in combination with Kang teach all the claimed elements as rejected above. Mai in combination with Kang does not specifically teach a mean squared difference algorithm.

Peterson teaches the two overlapping strips are selected according to a mean squared difference algorithm ("For example, the top left corner of the doorway is horizontally displaced from the bottom left corner of the image by a distance x0 in the first images 18a, while it is displaced by a distance x1 in the second image 18a. Consequently the second image is displaced to the left of the first image by a distance (d-left) given by the mathematical equation: d-left = x0-x1." at column 4, line 12).

Mai, Kang and Peterson are combinable because they are in the same field of image transformations, specifically, combining image portions.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to utilize a mean squared difference algorithm for user manipulation such that the sum of the mean squared difference values between two strips is minimized.

The motivation/suggestion for doing so would have been "to save processing time without altering the images and masking out portions of an image." at column 1, line 50+, Peterson.
Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai in combination with Kang and Peterson to obtain the specified claimed elements of Claim 35.

9. Claims 14, 15 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mai et al. (US 20040057633 A1) in combination with Kang et al (US 20030235344 A1) and further in view of Xiong et al. (US 20020114536 A1).

Regarding Claim 14 (Currently Amended): Mai in combination with Kang teach all the claimed elements as rejected above. Mai in combination with Kang does not specifically teach the iterative blending of images.

Xiong teaches the blending of images is performed iteratively ("An improved iterative procedure is disclosed for the blending that also determines at what level of the pyramid to perform blending…" at abstract) with the blended composite image being utilized as one of the selected two images to be blended (Refer to paragraph [0092]; "Previously blended images may be blended with new images, and blending may be iterated, with human input or automatically.")

Mai, Kang and Xiong are combinable because they are in the same field of image transformations, specifically, combining image portions.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to blend images iteratively.

The motivation/suggestion for doing so would have been for example, "An improved iterative procedure is disclosed for the blending that also determines at what level of the pyramid to perform blending, and results in low frequency image components being blended over a wider region and high frequency components being blended over a narrower region." (at abstract, Xiong)

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai, Kang and Xiong to obtain the specified claimed elements of Claim 14.

Regarding Claim 15 (Currently Amended): Xiong teaches the method of blending is performed iteratively until all images comprising the scene have been blended into a final image of the scene (Refer to paragraph [0092]; "Previously blended images may be blended with new images, and blending may be iterated, with human input or automatically.")

Regarding Claim 37 (Currently Amended): Xiong teaches the selecting comprises selecting the strips of the two images which provide reduced error between the overlapping strips compared with non-selected strips of the two images (Refer to paragraph [0033]).

10. Claims 44 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mai et al. (US 20040057633 A1) in combination with Kang et al (US 20030235344 A1) and further in view of Murakami et al (US 6148118 A).

Regarding Claim 44: (New) Mai in combination with Kang teach all the claimed elements as rejected above. Mai in combination with Kang does not expressly teach using processing circuitry.

Murakami teaches selectings, dividing, determinings and blending using processing circuitry ("FIG. 16 is a block diagram showing the circuit configuration of an essential part of an apparatus according to a second embodiment of the invention;" at column 4, line 7)

Mai, Kang and Murakami are combinable because they are in the same field of image transformations, specifically, combining image portions.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to use processing circuitry.

The motivation/suggestion for doing so would have been "joining image data divided into a plurality of parts each having an overlap region with the other at a border line portion into a single image for output, an image processing apparatus joins the plurality of partial images having overlap regions at border line portions." (abstract, Murakami)

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai, Kang and Murakami to obtain the specified claimed elements of Claim 44.

Regarding Claim 45: (New) Murakami teaches storing the composite image (Refer to Figure 1, numeral 54-"Memory C")

11. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mai et al. (US 20040057633 A1) in combination with Kang et al (US 20030235344 A1) and further in view of Murakami et al (US 6148118 A) and Xiong et al. (US 20020114536 A1).

Regarding Claim 46: (New) Mai, Kang and Murakami in combination teach all the claimed elements as rejected above. Mai, Kang and Murakami in combination does not expressly teach displaying the composite image.

Xiong expressly teaches displaying the composite image (Refer to paragraph [0046]; "The user interface, suitable for display on a computer monitor and with input from a keyboard, mouse

pointer, or other I/O device, has fields for any and all internal and external parameters of the projection matrix of the images...")

Mai, Kang, Murakami and Xiong are combinable because they are in the same field of image transformations, specifically, combining image portions.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to display the output or composite image.

The motivation/suggestion for doing so would have been for example, "An improved iterative procedure is disclosed for the blending that also determines at what level of the pyramid to perform blending, and results in low frequency image components being blended over a wider region and high frequency components being blended over a narrower region." (at abstract, Xiong).

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai, Kang, Murakami and Xiong to obtain the specified claimed elements of Claim 46.

12. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mai et al. (US 20040057633 A1) in combination with Kang et al (US 20030235344 A1) and further in view of Peterson US (6,411,742 B1) and Hsu et al. (US 6078701 A).

Regarding Claim 18: (Previously Presented-As best understood by the Examiner) Mai, Kang and Peterson in combination teach all the claimed elements as rejected above. Mai, Kang and

Peterson in combination do not expressly teach at least one of the images is warped where the differences between the selected overlapping strips along the blending line exceed a predetermined threshold.

Hsu teaches at least one of the images is warped where the differences between the selected overlapping strips along the blending line exceed a predetermined threshold (Refer to column 10, lines 23-49).

Mai, Kang, Peterson and Hsu are combinable because they are in the same field of image transformations, specifically, combining image portions.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to warp at least one of the images where the differences between the overlapping strips exceed a predetermined threshold.

The motivation/suggestion for doing so would have been to "combine multiple still pictures and/or video frames to form a panoramic representation of an extended scene." at column 1, line 15+, Hsu

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai, Kang, Peterson and Hsu to obtain the specified claimed elements of Claim 18.

13. Claims 47 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mai

et al. (US 20040057633 A1) in combination with Kang et al (US 20030235344 A1) and further in view of Peterson US (6,411,742 B1) and Murakami et al (US 6148118 A)

Regarding Claim 47: (New) Mai, Kang and Peterson in combination teach all the claimed elements as rejected above. Mai, Kang and Peterson in combination do not expressly teach using processing circuitry.

Murakami teaches dividing, selecting, determining, blending and warping using processing circuitry ("FIG. 16 is a block diagram showing the circuit configuration of an essential part of an apparatus according to a second embodiment of the invention;" at column 4, line 7).

Mai, Kang, Peterson and Murakami are combinable because they are in the same field of image transformations, specifically, combining image portions.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to use processing circuitry.

The motivation/suggestion for doing so would have been "joining image data divided into a plurality of parts each having an overlap region with the other at a border line portion into a single image for output, an image processing apparatus joins the plurality of partial images having overlap regions at border line portions." (abstract, Murakami)

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai, Kang, Peterson and Murakami to obtain the specified claimed elements of Claim 47.

Regarding Claim 48: (New) Murakami teaches storing the composite image (Refer to Figure 1, numeral 54-"Memory C").

14. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mai et al. (US 20040057633 A1) in combination with Kang et al (US 20030235344 A1), Peterson US (6,411,742 B1) and further in view of Murakami et al (US 6148118 A) and Xiong et al. (US 20020114536 A1).

Regarding Claim 49: (New) Mai, Kang, Peterson and Murakami in combination teach all the claimed elements as rejected above. Mai, Kang, Peterson and Murakami in combination does not expressly teach displaying the composite image.

Xiong expressly teaches displaying the composite image (Refer to paragraph [0046]; "The user interface, suitable for display on a computer monitor and with input from a keyboard, mouse pointer, or other I/O device, has fields for any and all internal and external parameters of the projection matrix of the images...")Mai, Kang, Peterson, Murakami and Xiong are combinable because they are in the same field of image transformations, specifically, combining image portions.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to display the output or composite image.

The motivation/suggestion for doing so would have been for example, "An improved iterative procedure is disclosed for the blending that also determines at what level of the pyramid to

perform blending, and results in low frequency image components being blended over a wider region and high frequency components being blended over a narrower region." (at abstract, Xiong).

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Mai, Kang, Peterson, Murakami and Xiong to obtain the specified claimed elements of Claim 46.

Response to Arguments

15. Applicant's arguments filed 18 June 2009 have been fully considered and a complete response to those remarks is provided below.

Summary of Remarks:

Applicants hereby add new claims 44-49 which are supported at least by the teachings of Fig. 1 and the associated teachings of the specification.

Examiner's Response:

The newly added claims have been considered and are entered. No new matter is introduced by way of this amendment.

Summary of Remarks:

Applicant submits that the claims are clear and definite on their face. Moreover, Applicants respectfully submit that one of ordinary skill in the art … pursuant to the above authority would clearly understand the language of the claims including the terms difference or differences. Applicants respectfully request reconsideration and withdrawal of the 112, second paragraph, rejection.

Examiner's Response:

The Examiner respectfully disagrees and has maintained the 35 U.S.C. 112, second paragraph rejection. As stated above, regarding the term "differences" the Examiner is unclear what exactly the applicant is referring to. The term "differences" is considered vague and indefinite because the applicant has not defined how to determine that a "difference" exists between "two overlapping strips". MPEP 2106 states that limitations appearing in the specification but not recited in the claim should not be read into the claims. Please refer to the rejection for clarity regarding this rejection.

Regarding Claim Objections:

Applicants have amended the claims in an effort to further the prosecution of the application. Applicants respectfully request reconsideration and withdrawal of the objections to the claims.

Examiner's Response:

Reconsideration and withdrawal of the claim objections is granted herewith this response.

Regarding Claim Rejections under 35 U.S.C. 101:

Applicants respectfully submit claims 1 and 16 meet the statutory requirements of 101 using the test set forth by the Office on page 2 of the Action and Applicants respectfully request reconsideration and withdrawal of the 101 rejection in the next Action.

Examiner's Response:

The 35 U.S.C. 101 rejections are withdrawn. Claim 1 recites a "method for blending images into a composite image and further blending two images together along a minimized line to create a composite image.

It appears to the Examiner that the blending of two images would require a machine such as a computer or processor to realize the intended purpose of the method claim. A reasonable interpretation of the specification would lead one skilled in the art to require a computer programmed in accordance with the teachings of the present invention to accomplish the intended purpose of the invention. Similar claim analysis applies to independent claim 16.

Summary of Remarks:

Refer to pages 12-14; regarding the prior art rejections of independent claim 1, Mai and Kang fail to teach "determining difference between the overlapping strips." Applicants respectfully submit Kang and Mai, even if combined, fail to disclose positively-recited limitations of the claims and the 103 rejection is in error.

Examiner's Response:

The examiner respectfully disagrees. The examiner has also maintained that the applicant has failed to particularly point out and distinctly claim the subject matter which applicant regards as the invention by clarifying the term "differences" in the claimed recitation at claim 1. The Examiner interprets the claim limitation as rejected above, specifically that Mai et al (of record) at least teaches determining differences between the overlapping two strips ("The present invention also provides a method for rendering multiple, partially-overlapping input image strips of a target terrain into a seamless image mosaic of the target terrain that includes normalizing the intensity of each input image to a desired mean and standard deviation. A reference image and a secondary image, having a partially overlapping area and a common boundary area are provided. A segmented seam line between the reference and secondary image strips, that minimizes perspective imaging effects of elevated features in those images, is established. The

boundary area is divided into segments corresponding to the segments of the seam line. A balancing correlation matrix is computed for each such segment." at paragraph [0013]). The combination of the teachings of Mai and Kang more than fairly suggest the method for blending images into a composite image as recited at claim 1. The rejection has been clarified (as detailed above under section #5) and applicant's remarks are not persuasive.

Summary of Remarks:

At page 14, regarding the prior art rejections of claim 16, Applicants respectfully submit the above-recited limitations are not disclosed nor suggested by the prior art references taken alone or in combination.

Examiner's Response:

The Examiner respectfully disagrees. The examiner has also maintained that the applicant has failed to particularly point out and distinctly claim the subject matter which applicant regards as the invention by clarifying the term "differences" in the claimed recitation at claim 16. The Examiner has clarified the rejection and claim 16 is newly rejected under 35 U.S.C. 103(a) as being unpatentable in view of Mai in combination with Kang and Peterson (each made of record).

Summary of Remarks:

At page 15, Applicants respectfully submit the combination of Mai, Kang and Takiguchi fails to teach or suggest the above-recited limitations even if the numerous references are combined and the 103 rejection is in error for at least this reason.

Examiner's Response:

The Examiner respectfully disagrees. However, the arguments are moot in view of new grounds of rejection. See newly rejected claim 16 above.

Summary of Remarks:

At pages 15-16, with regard to independent claim 26; Applicants respectfully submit that positively-recited limitations of claim 26 are not disclosed nor suggested by the prior art and the 103 rejection of claim 26 is in error for at least this reason.

Examiner's Response:

The Examiner respectfully disagrees. However, the arguments are moot in view of new grounds of rejection. See newly rejected claim 26 above.

Summary of Remarks:

At page 16, with regards to independent claim 27, Applicants respectfully submit that numerous positively-recited limitations of claim 27 are not disclosed nor suggested by the prior art and the 103 rejection is in error.

Examiner's Response:

The Examiner respectfully disagrees. However, the arguments are moot in view of new grounds of rejection. See newly rejected claim 27 above.

Summary of Remarks:

Refer to pages 17; regarding the prior art rejections of independent claim 33, Mai and Kang fail to teach "determining difference between the overlapping strips and blending the two images

together along the minimized line to create a composite image." Applicants respectfully submit Kang and Mai, even if combined, fail to disclose the above-recited limitations of the claims and the 103 rejection is in error.

Examiner's Response:

The examiner respectfully disagrees. The examiner has also maintained that the applicant has failed to particularly point out and distinctly claim the subject matter which applicant regards as the invention by clarifying the term "differences" in the claimed recitation at claim 33. The Examiner interprets the claim limitation as rejected above, specifically that Mai et al (of record) at least teaches determining difference between the overlapping strips and blending the two images together along the minimized line ("The present invention also provides a method for rendering multiple, partially-overlapping input image strips of a target terrain into a seamless image mosaic of the target terrain that includes normalizing the intensity of each input image to a desired mean and standard deviation. A reference image and a secondary image, having a partially overlapping area and a common boundary area are provided. A segmented seam line between the reference and secondary image strips, that minimizes perspective imaging effects of elevated features in those images, is established. The boundary area is divided into segments corresponding to the segments of the seam line. A balancing correlation matrix is computed for each such segment." at paragraph [0013])

The combination of the teachings of Mai and Kang more than fairly suggest the method for blending images into a composite image as recited at claim 33. The rejection has been clarified (as detailed above under section #9) and applicant's remarks are not persuasive.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mia M. Thomas whose telephone number is (571)270-1583. The examiner can normally be reached on Monday-Thursday 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh M. Mehta can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Andrew W Johns/
Primary Examiner, Art Unit 2624

/Mia M Thomas/
Examiner, Art Unit 2624